Measuring mercury concentration

To the Editor,

Daniels et al.[1] studied the association between maternal fish intake and neurobehavioral development in the child. In a convenience subsample of 1054 selected from a larger number of births, the authors measured the mercury concentration in umbilical cord tissue. The authors expressed the mercury level on a wet-weight basis. Although fish-eating mothers had an increased cord-mercury concentration, Figure 1 suggests that, among fisheaters, the mercury concentration was independent of the frequency of fish intake. The paper includes only limited analytical quality information, except that subsequent analyses of other cords from the study were said to show lower results by another analytical method. We are therefore surprised that the authors conclude from their findings that maternal fish intake is a validated surrogate for mercury exposure. In our view, the cord mercury concentration is a possible candidate as methylmercury exposure biomarker, but it needs proper validation.

Previous studies using the cord mercury concentration have expressed the result in terms of dry weight.[2,3] This choice is meaningful, because the amount of watery Wharton's jelly varies considerably and decreases with the duration of gestation.[4] Our experience agrees with the statement by Daniels et al.[1] that the water content of the cord is usually about 85-90%. However, we find that the water content may vary from 62% to 95% in different cords. In 10 split samples, the wet-weight-based mercury concentration showed an average CV of 17%, i.e., much more than can be attributed to analytical variability. In contrast, mercury concentrations in split freeze-dried samples showed an average CV of 4 %, i.e., similar to the normal laboratory error.[2] The dry-weight based mercury concentration would therefore seem to be a more precise parameter. An imprecise exposure assessment will tend to underestimate the true effect of the exposure and may also complicate confounder adjustment.[5]

As noted by the authors, maternal assessment of the child's development up to 18 months of age is unlikely to be a sensitive measure of methylmercury neurotoxicity. More sophisticated testing at school age would be required. If such follow-up is conducted in this important cohort, we recommend that exposure assessment leave out the water and focus on the dry mercury concentrations.

References

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